



Calhoun: The NPS Institutional Archive

Reports and Technical Reports

All Technical Reports Collection

2010-05-12

Cost-Benefit Study of a Project to Lower Cost and Improve Readiness Through Integrating the Management of Technical Information



Calhoun is a project of the Dudley Knox Library at NPS, furthering the precepts and goals of open government and government transparency. All information contained herein has been approved for release by the NPS Public Affairs Officer.

Dudley Knox Library / Naval Postgraduate School
411 Dyer Road / 1 University Circle
Monterey, California USA 93943

<http://www.nps.edu/library>



Institute for Defense Analyses
4850 Mark Center Drive • Alexandria, Virginia 22311-1882

***Cost-Benefit Study of a Project to Lower Cost and
Improve Readiness Through Integrating the
Management of Technical Information***

Dan Levine

May 2010

Cleared for Public Release

- Current problems with managing data for Navy technical manuals and training courses
- “Bridge” project to relieve these problems by integrating (“Bridging”) the production of technical manuals and training courses
- IDA cost-benefit analysis of the Bridge
- Methodology for estimating the benefits
- Quantitative results
- Sensitivity analysis
- Further work



Current Problems with Managing Data for Technical Manuals and Training Courses

- Content management processes are non-integrated
- Tech writers and course developers obtain OEM contractor data in parallel
- Data are stored in different formats
- Data are stored in different repositories
- Course developers use different tools
- No systematic way to identify data requiring modification by equipment upgrades via ECPs (Engineering Change Proposals)



Bridge Project to Relieve Problems

- Proposal to integrate (“Bridge”) the management of data for technical manuals and training courses
 - Project is funded by OSD(AT&L)
 - Part of OSD RTOC program (Reduction of Total Ownership Costs)
- What are the expected costs and benefits of integration?
 - Are the benefits substantial?
 - Do they cover the costs?

	Production of Technical Manuals and Training Courses	
	Current Processes	Bridge
Content management	Non-integrated	Integrated
OEM data	Obtained in parallel	Obtained once
Data format	Various	Common—S1000D industry specification
Data repository	Various	Common—CSDBs
Course developer authoring tools	Various	Various, but with common link (API) to CSDBs
Identification of data requiring modification by ECPs	No systematic method	Single tool (Web Service)



Cost Benefit Analysis of the Bridge

- **Costs**
 - Investment
 - personnel cost of project
 - Implementation
 - training future tech writers and course developers to use the Bridge
 - Change in site licenses and user fees to maintain CSDBs
- **Benefits**
 - Reduction in future cost of technical manuals and training courses
 - Improvement in shipboard readiness through timely delivery of information (parametric analysis)
- Calculate 10-year costs and benefits (present values) using 2.4% annual discount rate mandated by OMB

- Analyze a nominal 500-page technical manual and nominal one-content-hour training course
 - Identify the detailed tasks
 - Estimate the staff hours to perform these tasks using current processes and the Bridge
 - Calculate Bridge savings (5.3% and 15.3% for manuals and courses)
 - Use pay rates to convert staff hour savings to cost savings
- Scale up the savings to two samples of Navy manuals and courses



Two Samples for Analysis of Savings

- OSD perspective
 - Reduction in total ownership costs
 - Would the benefits cover the costs for all Navy (and DoD) manuals and courses?
 - Apply Bridge to a large sample: all HM&E (Hull, Mechanical and Electrical) manuals and all NeL (Navy e-Learning) delivered courses
- LCS Program Office perspective
 - Would integration save money for a single system?
 - Apply Bridge to LCS mine hunting sonar (AN/AQS-20A)



Examples of Staff-Hour Changes Using the Bridge

	Staff Hours
Increase in cost	
Draft new business rules to integrate technical data and training	60
Coordinate technical data with training activities	44
Reduction in cost	
Greater data reuse	160
Web Service to modify technical information in response to ECPs	280
Use Web Service to update links with training product	72
Develop storyboards for training courses	16
Publish content in Learning Management Systems	11



Quantitative Analysis: Base Case

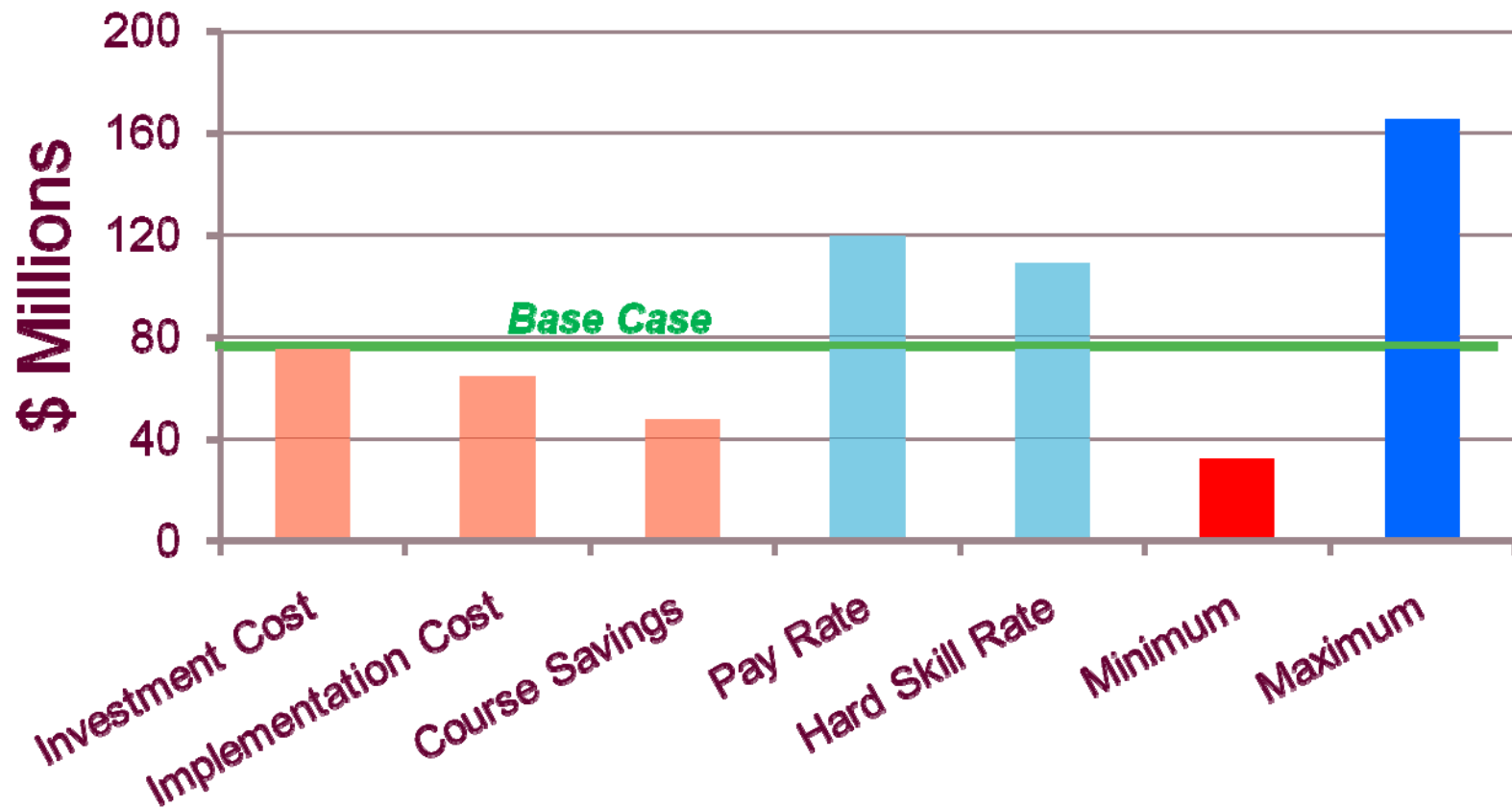
	10-Year Benefits (Present Value)
OSD Perspective (HM&E/NeL)	
Costs (investment, implementation)	\$8.7 million
Benefits (future savings)	\$86.8 million
Net benefit (benefits less costs)	\$78.1 million
LCS Perspective (mine hunting sonar)	
Benefits	\$305.7 thousand

- Study uses historical data
 - Production of HM&E technical manuals (NAVSSSES)
 - Annual content hours of Navy e-Learning training courses (NETC)
 - Manuals and Courses for mine-hunting sonar (NTSP)
- But the savings also depend on uncertain inputs

	Net Benefits	
	Base Case	Variation
Variations that lower net benefits		
100% higher investment cost	\$1.8 million	\$ 3.6 million
200% higher implementation cost	\$6.9 million	\$ 20.7 million
50% lower training course cost savings	15.3%	7.65%
Variations that raise net benefits		
50% higher hourly pay rate	\$65	\$97
50% higher hard skills rate	50%	75%



Results of Sensitivity Analysis (Net Benefits)



Applying the Bridge to all Navy (& DoD) manuals and courses
would increase net benefits

- Validate inputs during 2nd year of study

BACKUPS



Results of Sensitivity Analysis: OSD Perspective

	10-Year Net Benefits (Present Values)
Variations that lower net benefits	
100% higher investment costs	\$76 million
200% higher implementation costs	\$64 million
7.65% training course savings (vice 15.3%)	\$48 million
Variations that raise net benefits	
50% higher pay rate	\$120 million
75% hard skills (vice 50%)	\$109 million
Base Case	\$78 million
Minimum (all variations that lower net benefit)	\$32 million
All changes	\$77 million
Maximum (all higher net benefit)	\$166 million

Increasing sample to all Navy (DoD?) manuals and courses
would increase net benefits

- Recent Navy policy: after shipyard availabilities, don't deploy ships with new systems and equipment upgrades until all logistics support is in place
- Effect of the Bridge
 - Earlier completion of logistics support (manuals and courses)
 - Allow ships to be deployed sooner
- Parametric analysis: Permitting a single DDG-1000 to deploy a single month earlier would increase effectiveness of electronic, ordnance and HM&E components the Navy values as \$2 million.